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(71) Applicant: DAIKIN INDUSTRIES, LIMITED, Umeda Center Building 4-12 Nakazaki-nishi 2-chome Kita-ku, Osaka 530 (JP)

(72) Inventor: Ohmori, Akira, 16-22, Yamatedai 3-chome, Ibaraki-shi Osaka-fu (JP)
Inventor: Inukai, Hiroshi, 8-11-710, Showaen, Settsu-shi Osaka-fu (JP)

(74) Representative: Schüler, Horst, Dr. European Patent Attorney, Kaiserstrasse 41, D-6000 Frankfurt/Main 1 (DE)

(54) Fluorine-containing water-repellent oil-repellent composition.

(57) The present invention provides a fluorine-containing water- and oil-repellent composition comprising a fluorine-containing acrylate represented by the formula:

$$CH_2=C(-X)-COO-Y-Rf \quad (1)$$

wherein X is a fluorine atom or $-CFX^1X^2$ group (wherein X^1 and X^2 are the same or different and are each a hydrogen atom or fluorine atom), Y is alkylene having 1 to 3 carbon atoms, $-CH_2CH_2N(R)SO_2-$ group (wherein R is alkyl having 1 to 4 carbon atoms) or $-CH_2CH(OZ)CH_2-$ (wherein Z is a hydrogen atom or acetyl), and Rf is fluoroalkyl having 3 to 21 carbon atoms, or fluoroalkyl having 3 to 21 carbon atoms and 1 to 10 oxygen atoms in its carbon chain (wherein no two oxygen atoms are present adjacent to each other).

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Claims:

1. A fluorine-containing water- and oil-repellent composition comprising a fluorine-containing polymer which comprises at least 10 mole % of a fluorine-containing acrylate represented by the formula:

$$CH_2=C(-X)-COO-Y-Rf \quad (1)$$

wherein X is a fluorine atom or $-CFX^1X^2$ group (wherein X^1 and X^2 are the same or different and are each a hydrogen atom or fluorine atom), Y is alkylene having 1 to 3 carbon atoms, $-CH_2CH_2N(R)SO_2-$ group (wherein R is alkyl having 1 to 4 cabron atoms) or $-CH_2CH(OZ)CH_2-$ (wherein Z is a hydrogen atom or acetyl), and Rf is fluoroalkyl having 3 to 21 carbon atoms, or fluoroalkyl having 3 to 21 carbon atoms and 1 to 10 oxygen atoms in its carbon chain (wherein no two oxygen atoms are present adjacent to each other).

2. A composition as defined in claim 1 wherein the group Rf group in the fluorine-containing acrylate represented by the formula (1) is a group represented by the formula:

$$-((CF_2CF_2)_m(O)_n)_qCF(Rf^1)CF_3$$

wherein m is an integer of from 1 to 5, n is 0 or 1, q is an integer of from 1 to 5, and Rf^1 is a fluorine atom or trifluoromethyl, those represented by the formula

$$-\underset{\underset{CF_3}{|}}{CFO}(CF_2\underset{\underset{CF_3}{|}}{CFO})_pCF(Rf^1)CF_3$$

wherein p is an integer of from 0 to 5, and Rf^1 is as defined above, or those represented by the formula:

$$-Ph-Rf^2$$

wherein Ph is phenylene, and Rf^2 is perfluoroalkyl having 5 to 15 carbon atoms.

3. A composition as defined in claim 1 which comprises:

(i)10 to 90 mole % of the fluorine-containing acrylate represented by the formula (1), and

(ii)90 to 10 mole % of an ethylenically unsaturated monomer.

4. A composition as defined in claim 3 wherein the ethylenically unsaturated monomer is at least one of a monomer represented by the formula:

$$CH_2=\underset{\underset{COO-B}{|}}{\overset{\overset{A}{|}}{C}} \qquad (2)$$

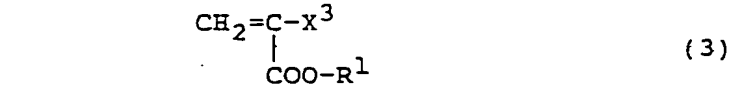
wherein A is a hydrogen atom, chlorine atom or methyl and B is alkyl having 1 to 20 carbon atoms, alicyclic group having 6 to 8 carbon atoms or fluoroalkyl having 1 to 10 carbon atoms; ethylene, propylene, styrene; and (metha)acrylate having vinyl, hydroxyl, carboxyl, glycidyl, dialkylamino or trialkoxysilyl.

5. A composition as defined in claim 1 which is in the form of a solution.

6. A composition as defined in claim 1 which is in the form of an aqueous dispersion.

7. A fluorine-containing water- and oil-repellent composition comprising a fluorine-containing polymer which comprises

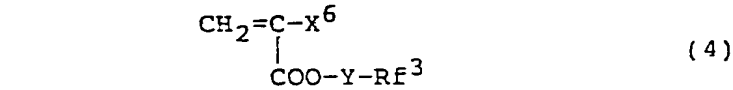
(i) 10 to 90 mole % of a monomer represented by the formula:



(3)

wherein X^3 is a fluorine atom, chlorine atom or $-CFX^4X^5$ group (wherein X^4 and X^5 are the same or different and are each a hydrogen atom or fluorine atom), and R^1 is alkyl having 1 to 20 carbon atoms, alicyclic group, aromatic group or aralkyl;

(ii) 10 to 80 mole % of a monomer represented by the formula:



(4)

wherein X^6 is a hydrogen atom or methyl, Y is alkylene having 1 to 3 carbon atoms, $-CH_2CH_2N(R)SO_2-$ group (wherein R is alkyl having 1 to 4 carbon atoms) or $-CH_2CH(OZ)CH_2-$ (wherein Z is a hydrogen atom or acetyl), and Rf^3 is fluoroalkyl having 3 to 21 carbon

atoms, or fluoroalkyl having 3 to 21 carbon atoms and 1 to 10 oxygen atoms in its carbon chain (wherein no two oxygen atoms are present adjacent to each other); and

(iii) 0 to 50 mole % of other copolymerizable ethylenically unsaturated monomer,

the combined amount of the monomers (i) to (iii) being 100 mole %.

8. A composition as defined in claim 7 wherein the group Rf^3 in the fluorine-containing acrylate represented by the formula (4) is a group represented by the formula:

$$-((CF_2CF_2)_m(O)_n)_qCF(Rf^4)CF_3$$

wherein m is an integer of from 1 to 5, n is 0 or 1, q is an integer of from 1 to 5, and Rf^4 is a fluorine atom or trifluoromethyl, those represented by the formula

$$-\underset{\displaystyle CF_3}{\overset{|}{C}}FO(CF_2\underset{\displaystyle CF_3}{\overset{|}{C}}FO)_pCF(Rf^4)CF_3$$

wherein p is an integer of from 0 to 5, and Rf^4 is as defined above, or those represented by the formula:

$$-Ph-Rf^5$$

wherein Ph is phenylene, and Rf^5 is perfluoroalkyl having 5 to 15 carbon atoms.

9. A composition as defined in claim 7 which is in the form oa s solution.

10. A composition as defined in claim 7 which is

in the form of an aqueous dispersion.